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UNITED STATES GOVERNMENT

Memorandum

25X1A5a1

EP 66-241

TO : The Files: Contract No. [redacted] DATE: 14 November 1966

25X1A9a

FROM : Mr. [redacted]

SUBJECT: Inspection Report No. 3 - AS-12 with [redacted] 25X1A5a1
25X1A5a1

1. Project Description:

Approximately three months of on-the-air tests will be conducted to determine how well the AS-12 operates, what ionospheric phenomena permit or prevent it from working, what changes should be included in future units, and what are the best procedures for operating the AS-12.

2. Contractual Information:

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a. Initial Cost: [redacted]
b. Request for Procurement Action: 1 April 1966
c. Initiation Date: 2 May 1966
d. Completion Date: 28 February 1967
e. Deliverable Items: Monthly progress letters, final report

3. Date of Meeting: 2 November 1966

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4. Place of Meeting: [redacted]

5. Persons Attending:

Agency	Non-Agency
25X1A9a Mr. [redacted]	[redacted] 25X1A5a1

6. Contractor's Performance:

a. On schedule and expected to remain so: Yes
b. Within obligated funds and expected to remain so: Yes
c. Satisfactory technical progress: Yes

7. Project Status:

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Security

A site survey was conducted by Messers [redacted] 25X1A9a
[redacted] was selected for the 2000 km tests 25X1A6a

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[redacted] 25X1A5a1

7. Project Status:

and [redacted], was selected for the 2,500 km tests. 25X1A6a
There is no 24 hour State Police office in [redacted] The Office 25X1A6a
of Logistics Security Staff approved the use of city police for equipment storage.

25X1A5a1 Mr. [redacted], is leaving the company.
His duties will be performed by Mr. [redacted] who has been handling 25X1A5a1
security matters on this program.

25X1A5a1 [redacted] Subcontract

Polaroid prints of the sounder receiver readout have been coming in weekly with the field log. The first contact prints were received on 14 October. The first IBM printout (which is where the detailed information is contained) was received on 24 October.

A transistor failed in the sounder transmitter programmer timer during the week of 17 October. The [redacted] technician at the site 25X1A5a1
25X1A5a1 accomplished the necessary repair after telephone consultation with [redacted] The equipment was down for less than one day.

A power supply transformer failed in the sounder transmitter 25X1A5a1
the week of 24 October. Mr. [redacted] technician who is operating the sounder receiver, traveled to the base station and replaced the supply with a unit shipped from the plant. Equipment was down for three days.

AS-12 Base Transmitter

The output power of the base transmitter dropped significantly on 31 October. The power amplifier is a seven stage distributed amplifier consisting of 14 4CX350A tubes. Arcing was observed in several of these tubes, and a number of cathode resistors and grid resistors were cracked and burned. The trouble was traced to a tube that had a grid to cathode short. Two tubes and several resistors were replaced. The unit was back in operation on 2 November. A full complement of spare tubes was ordered. It is estimated that the tubes presently in the amplifier have been operated for about 500 hours. It is not unusual to expect failures after that period of time.

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[redacted] 25X1A5a1

7. Project Status:

AS-12 Field Team

Field equipment has been operating satisfactorily, but a staffing problem has developed. Mr. [redacted] has had to return to [redacted] 25X1A5a1 25X1A6a for medical reasons and will be unable to return to the field. [redacted] 25X1A5a1 has not found a cleared technician who is willing to assume Mr [redacted] 25X1A5a1 field assignment on a permanent basis. This will result in unanticipated travel costs by rotating personnel to the field. [redacted] appeared only marginally concerned over this, and offered no alternative. 25X1A5a1

AS-12 Base Receiver

A serious problem has developed. The noise level at the receiver site, as measured by the interference detection unit (IDU), has risen to the extent that operation is virtually suspended. (AS-12 system operation permits soundings only on channels that are clear at the base. No clear channels equate to no operation.) The type of interference being experienced is QRM from distant locations. Several weeks ago the probability of sounding on given channels was being measured as typically .9. Now this probability on these same channels has dropped to .4 and less. [redacted] is trying to attribute this to 25X1A5a1 the change of season with attendant new propagation conditions and would like to stop the tests, call back the team from the field, and spend several weeks monitoring frequencies. They would then change the frequencies of the 20 bands to clear channels and resume testing. This could take many weeks, since a two month lead time for new crystals is not unusual.

The change in system performance was so sudden as to cause suspicion of an equipment malfunction. It was agreed that we would suspend operation for several days (but leave the team in the field) while a detailed investigation of the IDU would be made. The results of this investigation will determine the next step. See Epilogue

General System Performance

Because of the interference problem that exists at the base, the amount of data that has accumulated is very small and its accuracy is suspect. Much of the data concerns frequencies that are far from the optimum frequency for AS-12 operation, and consequently compilation of this data could lead to erroneous conclusions about the AS-12. It is, therefore, imperative that the interference problem be resolved before further tests resume.

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7. Project Status:

Some of the data can result in at least relative conclusions. Consider the period of 13 September to 16 September, daylight hours at the 500 km range. There were 110 first transmissions within a sequence. (This is a fairly small sample size, and 500 km is not a particularly good range; consequently, absolute conclusions should not be drawn.) Of these transmissions, 35 resulted in confirmations at the field set, indicating that the message was received with less than one percent error rate. As analysis of the data indicates that if we were to lower the acceptance criteria to three percent, the number of confirmations would increase to 54. A second transmission frequently resulted when the first transmission was not confirmed. Including these and considering the three percent error rate raises the number of confirmations to 60. Data gathered at the 1000 km range indicates that the confirm to transmission ratio is higher at the longer range.

Epilogue

By 8 November [redacted] had not yet re-run the acceptance tests on the interference detection receiver. They did, however, vary the method of establishing the IDU threshold. This threshold is controlled by a potentioneter located after the last IF. It is adjusted so that no sounding will occur in a channel with a signal greater than -130 dbw. (This value is based on the power of the field set. It has been varied at times during these tests to -125 dbw and -120 dbw.) This potentioneter was adjusted to a threshold of -140 dbw and a 10 db attenuator was placed between the antenna and antenna terminal. The measured probability of sounding on five bands is given below.

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	THRESHOLD	BAND 10	BAND 11	BAND 12	BAND 13	BAND 14
1900 - 2100 GMT	-130 dbw	0	0	0	0	.58
	-140 dbw w/10 db pad	.26	.06	.97	.01	.85
1300 - 1400 GMT	-130 dbw	.01	0	0	.46	.54
	-140 dbw w/10 db pad	.74	.24	.98	.5	.41

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7. Project Status:

This indicates that the receiver generates much intermodulation distortion (which is no great surprise since it has a 3.5 Mc front end). [redacted] will perform additional tests to further identify receiver deficiencies. 25X1A5a1

[redacted] 25X1A9a

has been done. Results now are very good. (H)

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OC-E/R&D-EP: [redacted] jah/3152 (16 Nov 66)
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also see subsequent report for 22 November.